

What is claimed is:

- 1           1.     An atomizer system comprising:
  - 2           a)     a melt material to be atomized;
  - 3           b.)    a containment portion for securing the melt material;
  - 4           c.)    a unit which accelerates the environment of the melt material such
  - 5           that the gravitational forces experienced by the melt material are elevated
  - 6           relative to Earth's standard gravitational force; and
  - 7           d.)    atomizing fluid that flows across an exposed surface of the melt
  - 8           material facilitating the establishment of liquid droplets that aerosolize and create
  - 9           fine particulates.
- 1           2.     The atomizer system of claim 1 further comprises means to
- 2           introduce relative motion between the containment portion and the melt material.
- 1           3.     The atomizer system of claim 2 wherein elements of the atomizer
- 2           system rotate on more than one axis.
- 1           4.     The atomizer system of claim 3 wherein the containment portion
- 2           spins as a liquid melt material is introduced into it.

1           5.     The atomizer system of claim 3 wherein the melt material is  
2 exposed to an acceleration that has components both normal and perpendicular  
3 to a retaining surface of the containment portion.

1           6.     The atomizer system of claim 1 wherein the unit accelerating the  
2 environment of the melt material is a centrifuge.

1           7.     The atomizer system of claim 1 further comprising a source of  
2 vibration to introduce disturbances within the melt material.

1           8.     The atomizer system of claim 1 wherein the flow of atomization fluid  
2 is non-continuous.

1           9.     The atomizer system of claim 1 wherein the containment portion is  
2 made of a solid form of the melt material itself.

1           10.    The atomizer system of claim 1 is capable of processing entrained  
2 (non-dissolved) fluid within the melt material to facilitate atomization for at least a  
3 portion of the overall atomization process.

1           11.    The atomizer system of claim 1 wherein the atomizing fluid is a gas.

1           12.    The atomizer system of claim 11 wherein the gas that is the  
2 atomizing fluid is inert.

1           13.    The atomizer system of claim 11 wherein the gas that is the  
2 atomizing fluid is oxidizing.

1           14.    The atomizer system of claim 11 wherein the gas that is the  
2 atomizing fluid is reducing.

1           15.    The atomizer system of claim 1 wherein the atomizing fluid is a  
2 liquid.

1           16.    The atomizer system of claim 15 wherein the liquid that is the  
2 atomizing fluid is inert.

1           17.    The atomizer system of claim 15 wherein the liquid that is the  
2 atomizing fluid is oxidizing.

1           18.    The atomizer system of claim 15 wherein the liquid that is the  
2 atomizing fluid is reducing.

1            19.    The atomizer system of claim 1 wherein the atomizing fluid contains  
2    particulates therein.

1            20.    The atomizer system of claim 1 wherein the thermodynamic  
2    conditions, i.e. temperature, pressure, and density, as well as velocity (axial and  
3    angular) of the atomizing fluid are user selectable.

1            21.    The atomizer system of claim 1 further comprising a cooling  
2    system.

1            22.    The atomizer system of claim 1 further comprising a liquefying  
2    system that subjects the material to be melted to elevated acceleration prior to  
3    liquefying.

1            23.    The atomizer system of claim 22 wherein the operation of the  
2    liquefying system is non-continuous.

1            24.    The atomizer system of claim 22 wherein the liquefying system  
2    applies radiant heating to the melt material to be atomized.

1           25.    The atomizer system of claim 22 wherein the liquefying system  
2   applies induction heating to the melt material to be atomized.

1           26.    The atomizer system of claim 22 wherein the liquefying system  
2   applies electric arc heating to the melt material to be atomized.

1           27.    The atomizer system of claim 22 wherein the liquefying system  
2   applies lasers to the melt material to be atomized.

1           28.    The atomizer system of claim 22 wherein the liquefying system  
2   applies hot atomizing fluid heating to the melt material to be atomized.

1           29.    The atomizer system of claim 22 wherein the liquefying system  
2   applies chemical reaction heating to the melt material to be atomized.

1           30.    The atomizer system of claim 22 wherein the liquefying system  
2   applies refractory containment heating to the melt material to be atomized.

1           31.    The atomizer system of claim 22 wherein the liquefying system  
2   applies plasma arc heating to the melt material to be atomized.

- 1           32.    A method of atomizing a material comprising the steps of:
- 2           a.)    accelerating the environment of the material to be atomized such
- 3           that the gravitational forces experienced by the material are elevated relative to
- 4           Earth's standard gravitational force; and
- 5           b.)    flowing an atomizing fluid across an exposed surface of the
- 6           material facilitating the establishment of liquid droplets which aerosolize and
- 7           create fine particulates.

- 1           33.    The atomizer method of claim 32 further comprises the step of
- 2           introducing relative motion between the containment portion and the melt
- 3           material.

- 1           34.    The atomizer method of claim 33 further comprises the step of
- 2           rotating the atomizer system on more than one axis.

- 1           35.    The atomizer method of claim 33 further comprises the step of
- 2           spinning the containment portion while introducing the liquid melt material into it.

- 1           36.    The atomizer method of claim 33 further comprises the step of
- 2           exposing the melt material to an acceleration that has both normal and
- 3           perpendicular components to the retaining surface of the melt containment
- 4           portion.

1           37. The atomizer method of claim 32 further comprises the step of  
2 accelerating the environment of the melt material in a centrifuge.

1           38. The atomizer method of claim 32 further comprises the step of  
2 introducing a source of vibration to facilitate disturbances within the melt material.

1           39. The atomizer method of claim 32 further comprises the step of  
2 controlling a non-continuous flow of atomization fluid.

1           40. The atomizer method of claim 32 further comprises the step of  
2 containing the melt material with a containment portion made of a solid form of  
3 the melt material itself.

1           41. The atomizer method of claim 32 further comprises the step of  
2 processing entrained (non-dissolved) fluid within the melt material to facilitate  
3 atomization for at least a portion of the overall atomization process.

1           42. The atomizer method of claim 32 wherein the atomizing fluid is a  
2 gas.

1           43.    The atomizer method of claim 42 wherein the gas that is the  
2   atomizing fluid is inert.

1           44.    The atomizer method of claim 42 wherein the gas that is the  
2   atomizing fluid is oxidizing.

1           45.    The atomizer method of claim 42 wherein the gas that is the  
2   atomizing fluid is reducing.

1           46.    The atomizer method of claim 32 wherein the atomizing fluid is a  
2   liquid.

1           47.    The atomizer method of claim 46 wherein the liquid that is the  
2   atomizing fluid is inert.

1           48.    The atomizer method of claim 46 wherein the liquid that is the  
2   atomizing fluid is oxidizing.

1           49.    The atomizer method of claim 46 wherein the liquid that is the  
2   atomizing fluid is reducing.



1           50.    The atomizer method of claim 32 wherein the atomizing fluid  
2   contains particulates therein.

1           51.    The atomizer method of claim 32 further comprises the step of the  
2   user selecting the thermodynamic conditions, i.e. temperature, pressure, and  
3   density, as well as velocity (axial and angular) of the atomizing fluid.

1           52.    The atomizer method of claim 32 further comprises the step of  
2   cooling at least one component of the atomizer.

1           53.    The atomizing method of claim 32 further comprising the step of  
2   subjecting the material to be liquefied to the intended acceleration prior to being  
3   liquefied.

1           54.    The atomizing method of claim 53 wherein the step of liquefying the  
2   melt material is non-continuous

1           55.    The atomizing method of claim 53 wherein the liquefying step  
2   applies radiant heating to the melt material to be atomized.

1           56.    The atomizing method of claim 53 wherein the liquefying step  
2   applies induction heating to the melt material to be atomized.

1           57.    The atomizing method of claim 53 wherein the liquefying step  
2   applies electric arc heating to the melt material to be atomized.

1           58.    The atomizing method of claim 53 wherein the liquefying step  
2   applies lasers to the melt material to be atomized.

1           59.    The atomizing method of claim 53 wherein the liquefying step  
2   applies hot atomizing fluid heating to the melt material to be atomized.

1           60.    The atomizing method of claim 53 wherein the liquefying step  
2   applies chemical reaction heating to the melt material to be atomized.

1           61.    The atomizing method of claim 53 wherein the liquefying step  
2   applies refractory containment heating to the melt material to be atomized.

1           62.    The atomizing method of claim 53 wherein the liquefying step  
2   applies plasma arc heating to the melt material to be atomized.